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ning of each regular issue of the PCT Gazette.*

(54) Title: COMBINED DNA/PROTEIN VACCINE COMPOSITIONS

(57) Abstract: The present invention relates to a novel, combined DNA/Protein antigen vaccine composition comprising nucleic acid molecules and a mineral-based, negatively charged adjuvant, so as to enhance the immunogenicity of the DNA vaccine efficiently enhancing not only plasmid DNA vaccines but also providing a novel strategy for immunogenic, multivalent combined protein/DNA vaccine delivery. Preferred adjuvants are aluminium or calcium salts, in particular aluminium phosphate.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

BIOSIS, EMBASE, WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 02591 A (MERCK & CO, INC.) 20 January 2000 (2000-01-20) cited in the application page 20, line 21 - line 27 examples claims	1-3, 5, 8, 9
Y	---	4, 6
X	WO 99 30733 A (SMITHKLINE BEECHAM BIOLOGICALS S.A.) 24 June 1999 (1999-06-24) page 9, line 18 - line 27 claims	1-3, 8, 9
X	WO 97 28818 A (THEREXSYS LIMITED) 14 August 1997 (1997-08-14) page 42, line 7 - line 19 claims	1-3, 8, 9
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 00 68259 A (G. LINDAHL) 16 November 2000 (2000-11-16) page 27, line 5 - line 8 page 29, line 7 - line 9 ---	4
Y	WO 93 24148 A (SMITHKLINE BEECHAM BIOLOGICALS (S.A.)) 9 December 1993 (1993-12-09) page 3, line 8 - line 12 ---	6
A	---	7
A	S. WANG ET AL.: "Enhanced type I immune response to a hepatitis B DNA vaccine by formulation with calcium- or aluminium phosphate." VACCINE, vol. 18, no. 13, 21 January 2000 (2000-01-21), pages 1227-1235, XP002234919 Guildford, GB cited in the application abstract page 1234, left-hand column, line 15 - line 21 -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/03353

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0002591	A	20-01-2000	AU 4973199 A CA 2336992 A1 EP 1094844 A1 JP 2002520299 T WO 0002591 A1 US 2002045594 A1	01-02-2000 20-01-2000 02-05-2001 09-07-2002 20-01-2000 18-04-2002
WO 9930733	A	24-06-1999	AU 740729 B2 AU 1967899 A BR 9814285 A CA 2313005 A1 CN 1284883 T WO 9930733 A1 EP 1037662 A1 HU 0100197 A2 JP 2002508333 T NO 20003087 A NZ 504936 A PL 341212 A1 TR 200001737 T2 US 2003072768 A1 US 6500432 B1 ZA 9811501 A	15-11-2001 05-07-1999 03-10-2000 24-06-1999 21-02-2001 24-06-1999 27-09-2000 28-05-2001 19-03-2002 08-08-2000 27-09-2002 26-03-2001 21-12-2000 17-04-2003 31-12-2002 15-06-2000
WO 9728818	A	14-08-1997	AT 225668 T AU 724716 B2 CA 2000597 A CA 2244110 A1 DE 69716240 D1 DE 69716240 T2 DK 880360 T3 EP 0880360 A1 ES 2184990 T3 WO 9728818 A1 JP 2000505802 T PT 880360 T US 2003100496 A1	15-10-2002 28-09-2000 28-08-1997 14-08-1997 14-11-2002 26-06-2003 27-01-2003 02-12-1998 16-04-2003 14-08-1997 16-05-2000 28-02-2003 29-05-2003
WO 0068259	A	16-11-2000	AU 4605100 A CA 2372497 A1 EP 1175437 A2 WO 0068259 A2	21-11-2000 16-11-2000 30-01-2002 16-11-2000
WO 9324148	A	09-12-1993	AP 567 A AT 168271 T AU 709406 B2 AU 1648097 A AU 4315693 A CA 2136429 A1 CN 1085450 A CZ 9402892 A3 DE 69319728 D1 DE 69319728 T2 DK 642355 T3 WO 9324148 A1 EP 0642355 A1 EP 0835663 A2 ES 2118963 T3	25-11-1996 15-08-1998 26-08-1999 29-05-1997 30-12-1993 09-12-1993 20-04-1994 13-09-1995 20-08-1998 04-02-1999 30-11-1998 09-12-1993 15-03-1995 15-04-1998 01-10-1998

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/03353

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9324148	A	FI 945483 A	20-01-1995
		HK 1011290 A1	28-04-2000
		HU 71791 A2	28-02-1996
		IL 105770 A	16-08-1998
		JP 7508267 T	14-09-1995
		MX 9302982 A1	01-12-1993
		NO 944475 A	18-01-1995
		NZ 253065 A	28-10-1996
		PL 174077 B1	30-06-1998
		RU 2160120 C2	10-12-2000
		SG 48365 A1	17-04-1998
		SI 9300271 A	31-12-1993
		SK 142194 A3	09-08-1995
		US 6013264 A	11-01-2000
		ZA 9303541 A	21-06-1994